National Institute of Environmental Health Sciences

Improving the use of modelling for projections of climate change impacts on crops and pastures

Author(s): Soussana JF, Graux AI, Tubiello FN
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Abstract:

Projections of climate change impacts on global food supply are largely based on crop and pasture modelling. The consistency of these models with experimental data and their ability to simulate the effects of elevated CO(2) and of increased climate variability has been debated. The effects of high temperatures, of increased climate variability and of several limiting factors which interact with elevated CO(2) such as soil nutrients, pests and weeds are neither fully understood nor well implemented in leading models. Targeted model developments will be required based on experimental data concerning: (i) the role of extreme climatic events, (ii) the interactions between abiotic factors and elevated CO(2), (iii) the genetic variability in plant CO(2) and temperature responses, (iv) the interactions with biotic factors, and (v) the effects on harvest quality. To help make better use of the available knowledge, it is envisioned that future crop and pasture modelling studies will need to use a risk assessment approach by combining an ensemble of greenhouse gas emission (or stabilization) scenarios, of regional climate models and of crop and pasture models, as well as an ensemble of adaptation options concerning both management practices and species/varieties.

Source: http://dx.doi.org/10.1093/jxb/erq100

Resource Description

Communication: ☑

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience: ☑

audience to whom the resource is directed

Researcher

Early Warning System: ☑

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure : ☑

weather or climate related pathway by which climate change affects health

Extreme Weather Event, Food/Water Security, Temperature

Extreme Weather Event: Drought

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

Global or Unspecified

Health Impact:

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology:

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Population of Concern: A focus of content

Population of Concern:

populations at particular risk or vulnerability to climate change impacts

Low Socioeconomic Status

Resource Type:

format or standard characteristic of resource

Review

Socioeconomic Scenario: SES scenarios

Timescale:

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content